# NATURAL RESOURCES CONSERVATION SERVICE
# CONSERVATION PRACTICE STANDARD
# *SOUTH DAKOTA SUPPLEMENTS ITALICIZED*

## DAM, DIVERSION
**(*no*.)**
**CODE 348**

### DEFINITION

A structure built to divert part or all the water from a waterway or a stream into a different watercourse, irrigation canal or ditch, or a water-spreading system.

### PURPOSE

This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. It does not apply to Diversions (362), Floodwater Diversions (400), Floodwater Retarding Dams (402), or Grade Stabilization Structures (410).

*The purpose of this standard is* (1) to divert part or all the water from a waterway in such a manner that it can be controlled and used beneficially, or (2) to divert periodic damaging flows from one watercourse to another watercourse having characteristics that reduce the damage potential of the flows.

### CONDITIONS WHERE PRACTICE APPLIES

Where a diversion dam is needed as an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources.

Where it is desirable to divert water from an unstable watercourse to a stable watercourse.

Where the water supply available is adequate for the purpose for which it is to be diverted.

Where the impact of a proposed dam on water quality, fish and wildlife habitat, forest, and visual resources are evaluated and the techniques and measures necessary to overcome the undesirable effects are made part of the work.

### PLANNING CONSIDERATIONS FOR QUANTITY AND QUALITY

#### Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge. Compare the original water course with the diverted water course.
2. Effects of the use of diverted waters for irrigation.

#### Quality

1. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff.
2. Potential temperature changes in downstream waters resulting from differences in bank shading in different water courses.
3. Potential changes in the amount of soluble substances infiltrating and available for ground water recharge as well as the potential for salt pick-up.

### DESIGN CRITERIA

*Unless otherwise specified herein, earthfill dams with or without conduit spillways shall be designed as follows: Class (a) dams with a product of storage times the effective height of the dam of less than 3,000 and with an effective height of the dam of 35 feet or less shall meet or exceed the requirements of the standards for Ponds (378).*

*Class (a) dams having a product of storage times the effective height of the dam of 3,000 or more; those more than 35 feet in effective height; and all*

*Class (b) and Class (c) dams shall meet or exceed the requirements specified in TR-60.*

**Materials.** All materials to be used in constructing the diversion dam and appurtenances shall have the strength, durability, and workability required to meet the installation and service conditions of the site.

**Outlet works.** If part of the flow is to be diverted, the outlet works must provide for positive control of both maximum and minimum diversions consistent with the purpose for which the diversion is made. If all the flow is to be diverted, the outlet works must provide for safe diversion of all expected flows, depending on site conditions.

**Bypass works.** The bypass works must be capable of passing all flows needed to satisfy downstream priorities and all flows in excess of diversion requirements, including expected flood flows. This may require a combination of orifices, weirs, and gates designed to meet the requirements of the site.

*The minimum design capacity of the structure, or the structure with emergency spillway is:*

*Embankment Dams - Ref: Ponds (378) or TR-60*

*Full Flow Open Structures - Ref: Grade Stabilization Structure (410)*

*A headgate shall be installed to control diverted flow into the canal or diversion ditch where control is needed to regulate the flow or prevent long duration flows.*

*Diversion dams installed in water channels for the purpose of waterspreading by backing water onto adjacent flood plain lands shall have an outlet pipe to permit lowering the water to a satisfactory level below the flood plain.*

*The outlet pipe shall be sized to drain the pool in time to prevent damage to the flooded area.*

**Special-purpose works.** If debris, bedload materials, or sediments are present under flow conditions subject to diversion, provision shall be made to bypass or remove materials that may be detrimental to the functioning of the outlet works, to other parts of the works, or to areas to which diversion is made. This may require the use of setting basins, debris traps, trash guards, or sluiceways, depending on site conditions.

**Vegetation.** Distributed areas not otherwise covered or protected shall be established to grass as soon as practicable after construction. If soil or climatic conditions preclude the use of vegetation and protection is needed, nonvegetative materials, such as mulches or gravel, may be used. Seedbed preparation, seeding, fertilizing, and mulching shall comply with instructions in local technical guides. The vegetation shall be maintained and undesirable species controlled by chemical or mechanical means.

**OPERATION AND MAINTENANCE**

Provisions shall be made as necessary for operation and maintenance requirements and may include a formal plan for larger more complex dams.

**PLANS AND SPECIFICATIONS**

Plans and specifications for installing diversion dams shall be keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Specified materials shall be of adequate quality to provide the stability and durability required to achieve the planned objective. Consideration shall be given to appropriate factors of safety.

Measures and construction methods that enhance fish and wildlife values shall be incorporated as needed and as practical.

Construction operations shall be carried out in such a manner that erosion and air and water pollution are minimized and held within legal limits.